



Figure 6.13. Schematic representation of a polyribosome. Five ribosomes are attached to the mRNA. The leftmost ribosome has just been added to the mRNA string and is beginning to form a polypeptide chain, whereas the rightmost ribosome has already formed a fairly long chain.

same protein. As shown schematically in Figure 6.13, those far along the chain would have nearly completed polypeptide chains, and would drop off when they finished. New ribosomes would then join the chains and ribosomes early on the chain would have just the beginnings of the polypeptide chain completed.³⁵

From the simple picture of the mid 1950s of one RNA-rich component of the cytoplasm serving as the locus of protein synthesis, a decade of research involving biochemists, cell biologists, biophysicists, geneticists, and molecular biologists had revealed a complicated structure of multiple component parts that performed different operations in the overall activity of protein synthesis. Although much remained to be filled in, a sketch of the mechanism at this lower level was established. There was no longer a mere empirical finding that ribosomes were involved in protein synthesis; rather, there was an account, in broad detail, of the mechanism responsible for protein synthesis.

³⁵ Rich also conducted a number of experiments to test his model of the polysome assembly process. First he utilized a homogenizer before centrifugation, which produced a number of peaks in terms of both ultraviolet absorption and radioactivity. He proposed that each successive peak corresponded to an additional ribosome in a cluster, a proposal he confirmed in collaboration with electron microscopist Cecil Hall by subjecting material from each fraction to electron microscopy and finding evidence of the predicted clusters.